

## **METHOD FOR MODIFICATION OF RADIOTHERAPY TREATMENT DELIVERY**

### **ABSTRACT**

The present invention provides a novel method of contoured-anatomy dose repositioning  
5 (CADR) as a means to automatically reposition a patient to better recover the planned dose  
distribution without reoptimize the treatment plan. Specifically, CADR utilizes planning CT  
images, the planned dose distribution, and on-line images for repositioning dose distribution on a  
given day. Contours are also placed upon the images using manual, automatic, template-based,  
or other techniques. CADR then optimizes the rigid-body repositioning of the patient so that the  
10 daily dose distribution closely matches the planned dose distribution. The present invention also  
provides a method of multiple-margin optimization with daily selection (MMODS) to improve  
radiation delivery without reoptimization. During the initial optimization procedure, plans are  
optimized for several margins of various contours (e.g., tight, medium, loose, etc.), or with  
different objectives (e.g., aggressive treatment, sensitive structure sparing, etc.). Similarly, if  
15 multiple patient image sets are available, plans can be optimized for the different anatomical  
layouts, either using current information, or accumulated information regarding the superposition  
of organ locations in the combination of images. A user can then choose in real time from a  
variety of optimized plans, generally with different margins, during the treatment process, and  
thereby compensate for a recognized change in size or position of the tumor or neighboring  
20 tissue.

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